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A. JOLY.

THE recent death of Professor A. Joly, director of the chemical laboratory of the École Normale Supérieure and professor in the Paris Faculty of Sciences, deserves more than passing mention. His early work was as an assistant in the laboratory of Sainte-Claire Deville, and later he became sub-director of the École Normale laboratory under Debray, whom he succeeded. His first published work (1875-7) was on columbium and tantalum, in which he added much to our knowledge of these rare elements, formed synthetically several of the rare columbium minerals, and proved the non-existence of Marignac's *ilmenium*. His next work (1882-7) was on the general and thermal chemistry of the acids of phosphorus and arsenic, among the points touched upon being the relations of these acids and baric acid to indicators. No less than twenty-four papers, mostly published in the *Comptes Rendus*, belong to this period. It was at this time, too, that he made a study of the carbide of boron, as he had earlier that of columbium, and carried this work as far as was possible till the introduction of Moissan's electrical furnace.

Joly's most important work dates from 1888, when he entered upon the study of the rarer elements of the platinum group, beginning, in conjunction with Debray, upon the oxides of ruthenium. Potassium ruthenate and perruthenate were for the first time obtained in a pure and crystallized condition; the supposed tetrachloride of ruthenium of Claus, having an analogous formula to that of the chlorides of the other platinum metals, was shown to be not RuCl_4 , but RuCl_3NO , a nitroso-chloride, in which the NO group acts in the place of a halogen atom; several new series of ruthenium ammonium bases were formed, among them one derived from the nitroso-chloride—

'ruthenium red'—which possesses wonderful tinctorial powers, closely resembling an organic dyestuff. It has been used in histology and bacteriology, and is said to be the 'only reagent for the products of transformation of pectic compounds.'

In other papers the constitution of osmic acid of Fritzsche and Strube was at last cleared up, it proving to be a nitroso compound; the double nitrites of the platinum metals were studied, and their action when decomposed by heat; and a new method was devised for separating the platinum metals. Atomic weight determinations of ruthenium, iridium and palladium were made, the first being particularly valuable, as there had been no work on this since that of Claus, and Joly's determination brought ruthenium into its proper place in the periodic table. By means of the electric furnace Joly was enabled for the first time to obtain ruthenium and osmium in a coherent state and to study the properties of the fused metals.

Altogether in his less than a quarter of a century of work Joly published about sixty papers, a number of the later ones in conjunction with Vèzes and Leidié. He was the author of numerous articles in the *Encyclopédie Chimique* (Dunod), and the author of a number of text-books, which have been through several editions: *Éléments de chimie*; *Cours élémentaire de chimie et de manipulations chimiques*, 3 vols; and *Cours élémentaire de chimie* (notation atomique), 3 vols. Professor Joly was one of the relatively few chemists whose lives have been devoted to inorganic chemistry, and who, working over and clearing up old fields once passed over but yet little explored, rather than penetrating into wholly unknown regions, has thereby served to put chemistry on a firmer basis. Dead at only fifty-one years of age, he can be ill spared.

JAS. LEWIS HOWE.